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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,953	12/31/2001	Loic Brunel	217782US2	5252

22850 7590 04/04/2005

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EXAMINER	
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ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/029,953	Applicant(s) BRUNEL, LOIC	
	Examiner Sudhanshu C. Pathak	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *December 31st, 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *December 31st, 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-9 are pending in the application.

Drawings

2. Figures 1-to3 should be designated by a legend such as "Prior Art" because only that which is known is illustrated.

   Correction is required.

Specification

3. Applicant is reminded of the proper content of an abstract of the disclosure.
A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.
The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

4. The abstract of the disclosure is objected to because of the following:

The abstract should be Applicant is reminded of the proper language and format for an abstract of the disclosure.
The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is not clear what "Fig. 4" in the abstract is referring to.

5. Applicant is reminded of the proper content of the disclosure.

Content of Specification

(a) Title of the Invention.
(b) Cross-References to Related Applications.
(c) Statement Regarding Federally Sponsored Research and Development.
(d) Incorporation-By-Reference Of Material Submitted On a Compact Disc.

(e) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:

(1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."

(2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

(f) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

(g) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

(h) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication, which adequately describes the subject matter.

(i) Claim or Claims.

(j) Abstract of the Disclosure.

6. The disclosure is objected to because of the following informalities:

   - On Page 2, line 12, the specification discloses, "lattice to be used generally being 2.K", this should actually be "lattice to be used generally being 2K".
   - On Page 4, line 2, the specification discloses, "of dimension 2.K", this should actually be "of dimension 2K".
   - On Page 5, line 30, the specification discloses, "of dimension 2.K", this should actually be "of dimension 2K".
   - On Page 6, line 34, the specification discloses, "of dimension 2.K", this should actually be "of dimension 2K".
   - On Page 10, line 3, the specification discloses, "of dimension 2.K", this should actually be "of dimension 2K".
   - On Page 9, line 16, the specification discloses, "covariance matrix N_o.R(i). R being", this should actually be "covariance matrix N_oR(i) where R being".
   - On Page 15, line 18, the specification discloses, "sector II" this should actually be "zone II".
   - On Page 15, lines 24-25, the specification refers to a "parallelepipedal constellation", it is not clear as to what is meant by the above mentioned constellation. There is not sufficient description in the specification as to what is a "parallelepipedal constellation".

Appropriate correction is required.

Claim Objections

7. Claim 1 is objected to because of the following:

The claim refers to a "plurality K of symbols.....for a plurality K of users", the claim does not define "K" to be an integer. Furthermore the sentence should actually be re-written as "plurality of K symbols.....for a plurality of K users". Furthermore, it is not clear what is meant on Claim 1, line 1-2, by ".....transmitted by or for a plurality.....", the sentence should be re-written as ".....transmitted by a plurality.....".

Appropriate correction is required.

8. Claims 6-10 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim(s) should refer to other claims in the alternative only **and** cannot depend from any other multiple dependent claims. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make

and/or use the invention. The specification does not describe, in such a way as to enable one skilled in the art to which it pertains, an affine subspace, and how the affine subspace is related to the constellation space. Furthermore, the specification on Page 7, lines 18-21 refers to the ".....affine subspace, referred to as a projection subspace, parallel to or merged with an affine subspace.....", it is not clear as to how the affine subspace to be parallel or merged to itself.

The applicant is reminded not to introduce new matter into the disclosure. The added material should be supported by the original disclosure, but should clarify the above-mentioned subject matter.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 1-5 & 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brunel et al. (Euclidean Space Lattice Decoding for Joint Detection in CDMA Systems; Proceedings of IEEE ITW; June 20-25, 1999; Page 129) in view of Umeda et al. (An Adaptive Filtering Algorithm using an Orthogonal Projection to an Affine Subspace and its Properties; Electronics and Communications in Japan; Vol. 67-A, No. 5; 1984; Pages 19-27).

Regarding to Claims 1-5 & 7-9, Brunel discloses a method of detecting a plurality K of symbols ($d_k(i)$) transmitted by or for a plurality K of users from a received signal,

each symbol of a user belonging to a modulation constellation, the detection method using a lattice of points generated by the said modulation constellations, the said plurality of symbols of the different users being represented by a point amongst a subset of points in the said lattice, the said constellation and the received signal being represented by a point characteristic of this signal, referred to as the received point, translated from a point in the said constellation by a noise vector (n) (Euclidean Space Lattice Decoding for Joint Detection in CDMA Systems; Proceedings of IEEE ITW; June 20-25, 1999; Page 129). Brunel also discloses determining the constellation according to the position of the received point with respect to the constellation wherein the closest neighbor is limited to points in the constellation belonging to a sphere centered (Page 129, left column, Introduction & Lattice Representation). Brunel also discloses implementing the method in a DS and MC-CDMA telecommunications (Page 129, left column, Abstract & Introduction). Brunel also discloses the method characterized in that, the symbols of each user being the subject of a multiplication by a signature of this user before being transmitted over a transmission channel, the coordinates of the received point are obtained by a step of adapted filtering of the received signal, the filtering being adapted to the transmission channels and to the signatures of the different users (Page 129, left column, Abstract & Introduction & Page 129, right column, Analytical Performance). However, Brunel does not disclose the step of orthogonal projection of the received point onto an affine subspace, referred to as a projection subspace, parallel to or merged with an affine subspace delimiting the said constellation, and a

step of seeking the closest neighbor to the point thus projected amongst the points in the said constellation.

Umeda discloses a method and algorithm for system identification, noise-elimination and equalization called affine projection algorithm (APA) (Page 19, left column, Summary & Page 19, right column, lines 30-37). Umeda also discloses the method comprising orthogonal projection to an affine subspace (Fig.'s 2-3 & Page 20, left column, lines 1-7 & Page 22, left column, lines 32-38 & Page 22, right column, Section 4, lines 1-53 & Section 4, Page 23-to-Page 26). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Umeda teaches the step of orthogonal projection of the received point onto an affine subspace, referred to as a projection subspace, parallel to or merged with an affine subspace and this algorithm can be implemented so as to detect transmitted symbols using a lattice of points and a step of seeking the closest point of the lattice as described in Brunel, thus satisfying the limitations of the claims. Furthermore, even though Umeda teaches implementing the algorithm in system identification, noise-elimination and equalization it can also be implemented in detecting the received symbols so as to provide an increased speed of convergence with minimal complexity to detect the symbols.

13. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brunel et al. (Euclidean Space Lattice Decoding for Joint Detection in CDMA Systems; Proceedings of IEEE ITW; June 20-25, 1999; Page 129) in view of Umeda et al. (An Adaptive Filtering Algorithm using an Orthogonal Projection to an Affine

Subspace and its Properties; Electronics and Communications in Japan; Vol. 67-A, No. 5; 1984; Pages 19-27) in further view of Tanrikulu (WO 00/41374).

Regarding to Claim 6, Brunel in view of Umeda discloses a method for detecting a plurality K of symbols ($d_k(i)$) transmitted by or for a plurality K of users from a received signal, each symbol of a user belonging to a modulation constellation, the detection method using a lattice of points generated by the said modulation constellations, the said plurality of symbols of the different users being represented by a point amongst a subset of points in the said lattice, the said constellation and the received signal being represented by a point characteristic of this signal, referred to as the received point, translated from a point in the said constellation by a noise vector (n), characterized by the step of orthogonal projection of the received point onto an affine subspace, referred to as a projection subspace, parallel to or merged with an affine subspace delimiting the said constellation, and a step of seeking the closest neighbor to the point thus projected amongst the points in the said constellation as described above. However, Brunel in view of Umeda does not disclose that the projection step is performed only if the received point is remote from the said constellation by more than a predetermined distance.

Tanrikulu discloses performing the projection step is performed only if the received point is remote from the said constellation by more than a predetermined distance (Abstract, lines 1-12 & Page 4, Summary of the Invention & Page 5 & Page 6 & Fig.'s 5, 7-8 & Claim 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Tanrikulu teaches performing

the projection step is performed only if the received point is remote from the said constellation by more than a predetermined distance and this can be implemented in the method for detecting as described in Brunel in view of Umeda so as to provide a computationally efficient decoding method general enough to be used for all constellation configurations, thus satisfying the limitations of the claim.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, it is recommended to the applicant to amend all the claims so as to be patentable over the cited prior art of record. A detailed list of pertinent references is included with this Office Action (See Attached "Notice of References Cited" (PTO-892)).

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak

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